# MARKET PERCEPTION OF FOUR KNOWLEDGE BASE SYSTEMS

### February 1, 1989

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IBM

DG-W

cut these to fit
the covers or cut
a bigger hole

# MARKET PERCEPTION OF FOUR KNOWLEDGE BASE SYSTEMS

## February 1, 1989

Issues?

1. Jim Cates: Is enduser myth limited to these 4 products or could their be a Lotus 1-2-3 for ES?
(Tom W. — this may be a $f$ (Data Center v. Personal Computing Environment)

Note: Knowledge Tool is IBM's answer to ADS et al here but he believes there is an end user mkt

2. Add list of organizations surveyed

3. Note to Cates: If IBM owned ADS, max success by educating branches & turning them loose. Aion's best bet is to leverage vertical mkt specialists vzā licensing other SW vendors who have established distribution channels and customer bases (witness Bock & Babbage)
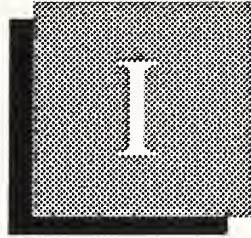
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# I

# Executive Presentation

## Executive Presentation:
## Outline

- Research objectives and methods

- Industry overview and product histories

- Company overviews

- Types of knowledge base applications

- Product overviews: Satisfaction, strengths and weaknesses

|              |   |         |
|--------------|---|---------|
| AI Corp.     | - | KBMS    |
| Aion         | - | ADS     |
| IBM          | - | ESE     |
| Neuron Data  | - | NEXPERT |

- Product and vendor cross comparisons

- Product directions and positions

- High-level competitive options

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# Research Objectives

- **Determine market perceptions of selected mainframe knowledge base systems**

- Specifically:

    - Applications
    - Strengths and weaknesses
    - Unmet user needs
    - Integration: Standalone vs. embedded vs. connected
    - Future vendor directions
    - Hardware and software platforms
    - Perceptions of vendors

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# Research Methodology

- **Performed by outside firm:  INPUT**
  - International market research and consulting firm
  - 15 years old; privately owned
  - Information industries specialists
  - Project team:  Two seniors, each with hands-on expert systems background

- **In-depth telephone interviews (36 users, total)**
  - Early January 1989
  - Carefully qualified interviewees
  - Average:  30 minutes each
  - 3 products:  10 interviews each
  - 1 product (new): 6 interviews

- **Each vendor:  2 to 4 interview contacts**

- **User questionnaire development**
  - 15 pages, 35 main topics
  - IBM review, INPUT revision
  - Pre-test validation

- **Analysis and report writing**
  - Analysis objective:  Competitive patterns, not statistics
  - Emphasis:  Strengths and weaknesses (qualitative)
  - Found highly consistent responses
  - Result:  Picture of buyers' perceptions of each product
  - Averaging of numeric ratings
  - Competitive cross comparisons
  - Other information
  - Patterns, trends, IBM options

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# Industry Overview
# and Product Histories

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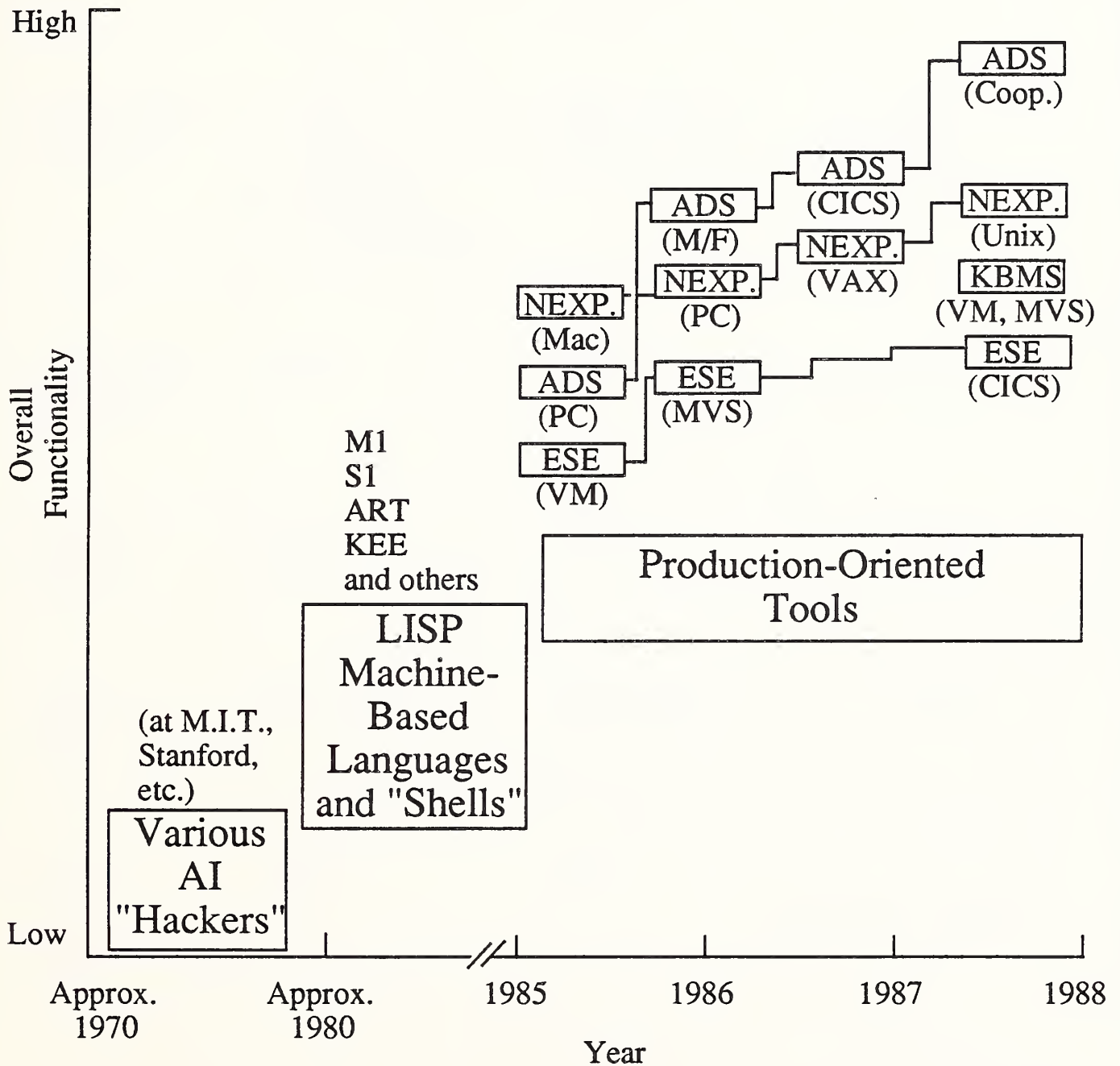
## Companies and Products:
## Quantitative Overview

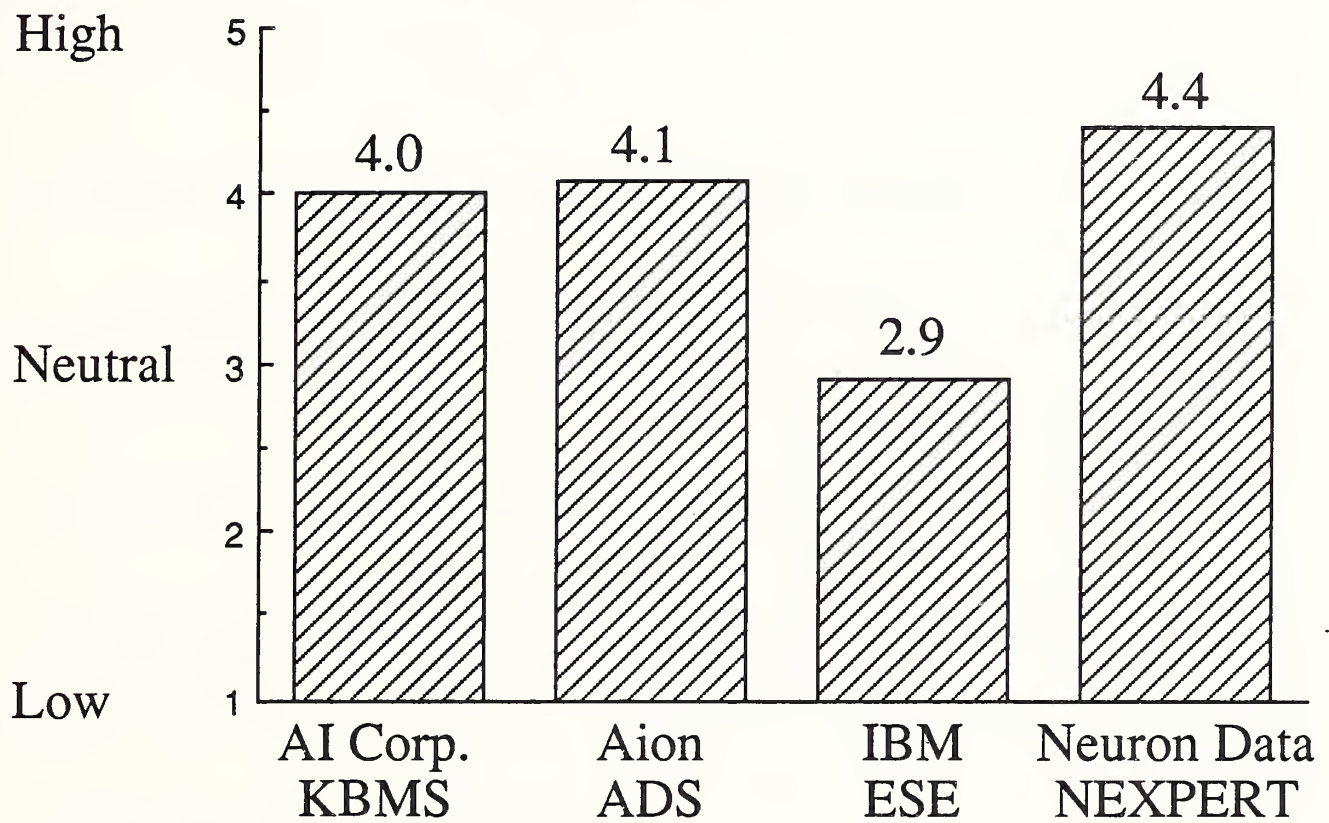| Company - Product | 1988 Company Revenues ($ Millions) | Number of Employees | Product Licenses to Firms |
|---|---|---|---|
| AI Corp. - KBMS | $15 | 90 | 25 |
| Aion - ADS | $10 (est.) | 100 | 200 |
| IBM - ESE | $60,000 | 385,000 | 200 |
| Neuron Data - NEXPERT | N/A | 50 | ? (4,000 copies) |

*seems awfully large ?*

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# Which Types of Applications
## Are Being Built,
## by Whom

- **Mostly "diagnosing/classifying" applications**

    - Over 50%: Data analysis, interpretation
      (Examples: Insurance underwriting, bank lending)

    - About 20%: Use advising, procedures
      (Example: Help desk)

    - Others: Controlling, planning, configuration,
      simulating

- **95% of sample: No end-users build or modify
  expert system applications**

    - Almost always: "Knowledge engineers" were
      programmers

    - Mostly: Same person builds knowledge base,
      programs interfaces, and solves DP environment
      problems

- **Conclusion: Despite relative simplicity of
  applications, end-user development of expert
  systems is a "fiction"**

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# Satisfaction: Comparing
# Price with Overall Value



High    5

        4.0         4.1                         4.4

        4

Neutral 3                         2.9

        2

Low     1
        AI Corp.    Aion        IBM     Neuron Data
        KBMS        ADS         ESE     NEXPERT

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## AI Corp. - KBMS

## Strengths

- **Full-featured new object-oriented system**

    - One object can replace several rules
    - "A solid AI tool"

- **Capable of data base interfacing**

    - "Our AI applications depend on these KBMS
      interfaces to mainframe databases"

- **Runs on the mainframe**

    - "Practical problem-solving in our production
      environment"

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## AI Corp. - KBMS

## Weaknesses

- **New product, still has some bugs**

- **Barely production-tested**

  - "We don't know yet how much CPU it will chew up"

- **Appears to perform slowly with a large KB**

  - "Sluggish response will limit our use if not corrected"

- **PS/2-based development/production option not due until 4/89**

  - "We'll mix or match platforms as appropriate"

- **Modular, shared development not feasible**

  - Cannot split work among developers, then easily combine

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## Aion - ADS

## Strengths

- **Generally superior AI functions**
  - "Aion has the best product on the market"
  - Easy to learn and use

- **Very good production functions**
  - "Built for IBM production-environment integration"

- **Mainframe/PC portability**
  - "We get both flexible PC development and controlled mainframe production"

- **Strong, credible vendor**
  - Founders are ex-IBMers, who deliver as they promise
  - "The founders are still closely involved, and really listen"
  - "The product is still growing in all the right ways"

- **Excellent customer support**
  - "I get clear answers fast, often directly from a developer"

- **Wide range of database interfaces**
  - "We didn't have to reformat any of our databases to interface"

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## Aion - ADS

## Weaknesses

- **A few AI and production functions are still limited**

  - "For large KBs, better diagramming would help"
  - Strong object-oriented capabilities not due until mid-89
  - "In mid-89, cooperative processing will really help us"

*conflict w/ ZESP I-4 chart*

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## IBM - ESE

### Strengths

- **Easy to learn**

    - "I can get programmers up and running fast"
    - IBM-provided sample applications help

- **Easy to develop with**

    - System documents the application automatically
    - "Our developers like seeing end-user impacts of KB changes immediately"

- **Provides simpler AI functions usefully**

    - "Nesting of rules is handled effectively"

- **Strong vendor**

- **Some good database interfaces**

    - SQL-based access to DB2

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## IBM - ESE

## Weaknesses

- **Lots of missing AI functions**

    - "It simply cannot handle sophisticated applications"
    - "IBM's product is way below the competition"
    - High on the list:  Object-oriented development

- **Missing some production functions**

    - "We need a compiled version for speed"
    - Abends - with major loss of data - can result from errors in setting up the environment
    - "We really need the CICS version, due out late 88 or early 89"

- **PC-based development and production needed**

    - Some Aion/ADS users:  "That's why we dropped IBM's ESE"

- **More and better interfaces needed**

    - "DB2 is not enough"
    - Two-way application interfaces are very important

- **Support is strong or weak, depending on local SE**

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## Neuron Data - NEXPERT

## Strengths

- **Very strong objects/rules hybrid**

  - "A powerful combination, more than the sum of the parts"
  - Good inferencing control, easy KB maintenance

- **Excellent graphics-based development**

  - "An intuitive approach to development"

- **Portability among Macintosh, VAX, PC**

  - Not yet mainframe (under MVS)
  - Many users develop on Mac, deliver on PC
  - "They've taken an excellent C-based approach"

- **Good database/application interfaces**

  - "Connects well with our pre-existing DBs and applications"

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## Neuron Data - NEXPERT

## Weaknesses

- **Some AI functions are still limited**

  - Editing requires awkward environment shifts
  - Object functions not yet fully robust

- **Some problems with production**

  - "Portability and interfacing are tougher than claimed"

- **Documentation**

  - Some errors, not enough "how to"

- **Confused vendor support**

  - Split among Neuron Data, Bechtel, DEC
  - "I often have trouble getting clear, timely answers"

- **Some bugs and crashes**

  - "We've had some very ungraceful crashes"

- **Some missing features**

  - Especially for development of end-user graphics

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# Cross Comparison of Products:
## Strong Capabilities

| Capability | AI Corp. KBMS | Aion ADS | IBM ESE | Neuron Data NEXPERT |
|---|---|---|---|---|
| AI functions | X | X | | X |
| Easy to learn | X | X | X | X |
| Ease of dev. | X | X | X | X |
| Object-or. dev. | X | X* | | X |
| Graphics-b. dev. | | | | X |
| Modular dev. | X* | X | | |
| User graphics | | | X | X* |
| Prod'n func. | X* | X | | X* |
| Mainframe-based | X | X | X | X* |
| Portab. MF/PC | X* | X | X | X* |
| 640K+ memory | X* | X | X* | X |
| Coop. proc. | X* | X | | X |
| Wide interfaces | X | X | | X |
| Bug-free | | X | X | |
| Crash-free | | X | | |
| Strong vendor | | X | X | |
| Superior support | | X | | |
| Estab. product | | X | X | |

Notes - "*" means planned for next release:
AI Corp. - KBMS: April 1989
Aion - ADS: Summer 1989
IBM - ESE: March 1989
Neuron Data - NEXPERT: Summer 1989

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# The Vendor Behind the Product:
## Users' Perceptions

- **AI Corp.**
  - Consistently strong technical-support organization
  - To most users, a "newcomer" with a good initial product entry
  - To co-developers, a fully supportive partner
  - To users of "Intellect" natural-language product, a solid vendor

- **Aion**
  - A company that plans well and delivers on its promises
  - A good blend of AI savvy and production-environment sensitivity
  - An involved and thoughtful management team that listens
  - Responsive and knowledgable technical staffers

- **IBM**
  - The mainframe vendor that they and their DP shop depend on
  - A disappointing AI software vendor
  - Good or poor product supporters, depending on the local SE
  - Strong trainers

- **Neuron Data**
  - Channel confusion: "Whose product is this, anyway?"
  - Technically astute in AI functions, but disjointed on support
  - In breadth of offerings, documentation is shallow
  - Some disappointments on promised non-AI functions

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# Future (1990-on) Product Directions:
## Vendor Interviews

- **AI Corp - KBMS**

  - Operation on more hardware platforms:  DEC VAX, Unix workstations

- **Aion - ADS**

  - Support for AS/400?
  - Implementation of IBM's SAA

- **IBM - ESE**

  - More AI capabilities
  - Wider database access
  - Operation on more hardware platforms:  AS/400
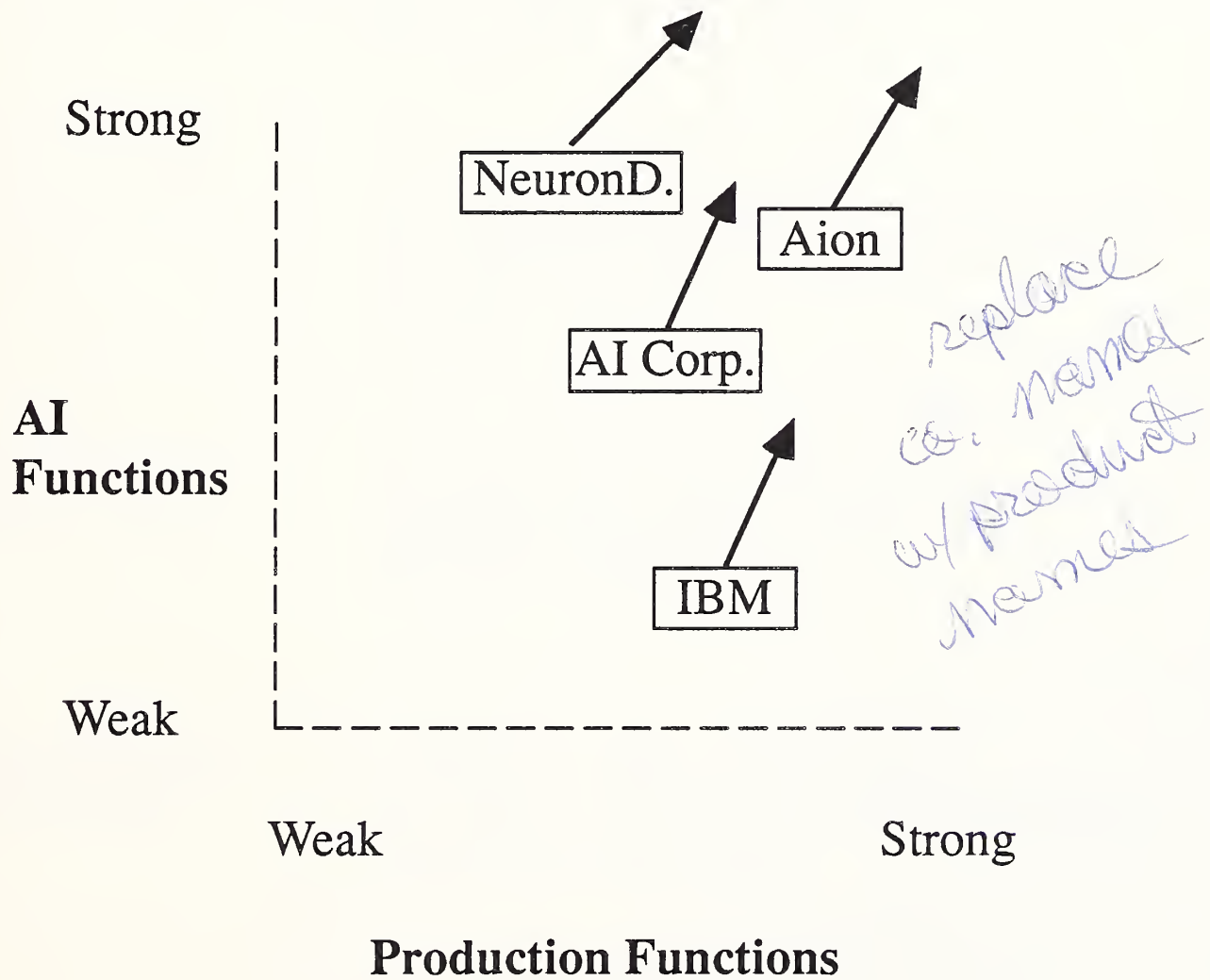  - "Non-monotonic" reasoning

- **Neuron Data - NEXPERT**

  - "Knowledge acquisition module":  System will extract KB from expert through dialog

  - Learning systems:  Rules will be developed by system from monitoring of production experience

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# Relative Product Positions and Expected Movement: INPUT's View



Strong

AI
Functions

NeuronD.

Aion

AI Corp.

IBM

*replace co. names w/ product names*

Weak

Weak                    Strong

**Production Functions**

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# Bicycling "Racing Machine" Images, Suggesting Comparative Capabilities

AI Corp. - KBMS:    "In its limited use so far, looks like a great three-speed bicycle"

Aion - ADS:    "In the city or up and down mountains, the top all-purpose choice for serious bikers"

IBM - ESE    "A good kid's bike with a fine set of training wheels"

Neuron Data - NEXPERT    "Could be used for the Tour de France, although the gear ratio has some annoying gaps"

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# Would You Still Choose the Product
# if Starting Again Now?

| Vendor - Product | Yes | No | Not Sure | Alternatives |
|---|---|---|---|---|
| AI Corp. - KBMS | 6 | 0 | 0 | - Aion - ADS |
| Aion - ADS | 23 | 0 | 0 | - (none) |
| IBM - ESE | 7 | 5 | 9 | - Aion - ADS (7 mentions)<br>- AI Corp. - KBMS<br>- IBM - Knowledge Tool<br>- Intellicorp - KEE<br>- Neuron Data - NEXPERT |
| Neuron Data - NEXPERT | 19 | 2 | 3 | - Gold Hill - GoldWorks<br>- LISP<br>- Expert system not required |

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# High-Level IBM Competitive Options
# for Evaluation

## 1. Radically strengthen ESE

- Positioning:  Give up "fiction" of end-user development
- Can ESE be strengthened enough to compete?
- Has Aion closed ESE's competitive window?

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## High-Level IBM Competitive Options
## for Evaluation

## 2. Plan to shift ESE users to IBM/KEE (?)

- What are the gaps in IBM/KEE AI functions?
- How good are its mainframe production functions
  and efficiency?
- How adequate are its interfaces and mainframe/PC
  portability?

*Not practical cause
KEE is positioned
for LISP type
prototyping, not
production environments
like IMS & CICS*

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# High-Level IBM Competitive Options
## for Evaluation

**3. Reposition and enhance IBM/Knowledge Tool (?)**

- How comprehensive are its AI functions?
- Can it connect, as well as be embedded?
- How good are its mainframe production functions and efficiency?
- How adequate are its interfaces and mainframe/PC portability?

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# High-Level IBM Competitive Options
## for Evaluation

**4. Purchase/remarket another, more competitive product**

- Is any of the other three products analyzed here available to IBM?
- Functionality of another product, vs. IBM/KEE or IBM/Knowledge Tool?
- Which other vendors/products should be considered?

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# High-Level IBM Competitive Options for Evaluation

1. Radically strengthen ESE

2. Plan to shift ESE users to IBM/KEE (?)

3. Reposition and enhance IBM/Knowledge Tool (?)

4. Purchase/remarket another, more competitive product

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# II
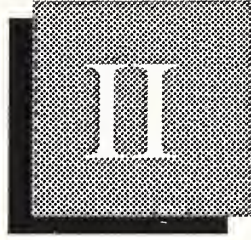
# Management Presentation

# Management Presentation: Outline

Who was interviewed

Hardware and software platforms

Key purchase criteria

Types of applications

Who builds the applications?

Marketplace: Standalone vs. embedded vs. connected

Applications: Production vs. development

Overall satisfaction with products

Satisfaction: Specific questions

Product-by-product strengths and weaknesses

Product-by-product missing features

Who is at the "state of the art"?

Vendor interviews: Today's product, and the next release

Vendor interviews: Future directions

Input's view: Product positions and movement

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# Who was Interviewed:
# Job Functions and Industries

- Job functions (across vendors)
  - Half: Management of knowledge base application development
  - Half: Hands-on developers

- AI Corp. - KBMS
  - 4: Financial services
  - 1: Telecommunications
  - 1: Electric Utility

- Aion - ADS
  - 6: Financial services
  - 2: Software
  - 2: Petroleum

- IBM - ESE
  - 5: Financial services
  - 2: Manufacturing
  - 1: Pharmaceuticals
  - 1: Telecommunications
  - 1: State government

- Neuron Data - NEXPERT
  - 4: Software
  - 2: Chemicals processing
  - 1: Health care
  - 1: Forest products
  - 1: Construction
  - 1: Aerospace

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# Hardware and Software Platforms

| Vendor - Product | Hardware | Operating Systems | Transaction Processing |
|---|---|---|---|
| AI Corp - KBMS | Mainframe | MVS/XA, VM | CICS, TSO, IMS/DC, IDMS/DC, CMS |
| | 4/89: PC | OS/2 | |
| Aion - ADS | Mainframe, PC | MVS, VM DOS, OS/2 | CICS, TSO, IMS |
| IBM - ESE | Mainframe | MVS, VM | CICS, TSO, IMS, CMS |
| | 3/89: PC | OS/2 | |
| Neuron Data - NEXPERT | Mainframe | VM 2Q89: MVS | SQL/DS CICS, TSO, IMS |
| | Mac, VAX, Unix work-stations | | |
| | PC | OS/2 | |

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# Key Decision Criteria
## at Time of Product Purchase

| Decision Criteria | Number of Mentions by Product | | | |
| --- | --- | --- | --- | --- |
| | AI Corp. KBMS | Aion ADS | IBM ESE | Neuron Data NEXPERT |
| Mainfr. plat. | 2 | 6 | 6 | |
| PC plat. | 1 | 4 | | 1 |
| Other plat's | | | | 5 |
| Portability | | 2 | | 2 |
| Vendor rep. | 3 | 1 | 5 | 1 |
| Cust'r ref's | | 1 | | |
| Tech. superior. | 2 | 4 | | 3 |
| Easy dev't | 1 | 2 | 2 | 2 |
| Easy prod'n | 2 | | 1 | 1 |
| Appl. embed/interf. | 4 | 2 | | 1 |
| DB access | 2 | 1 | 2 | 1 |
| Natural lang. | 1 | | | |
| Specific feat. | 1 | | | 1 |
| Operating sys. | | 2 | | 1 |
| Fits appli. | | 1 | | |
| Low cost | | | 3 | 1 |
| Easy proto'g | | | | 2 |
| No other cons'd | | | | 1 |

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# Application Types: Summary

| Type of Application | Number of Mentions, by Product | | | |
|---|---|---|---|---|
| | AI Corp. KBMS | Aion ADS | IBM ESE | Neuron Data NEXPERT |
| Data analysis/ interpretation | 5 | 15 | 9 | 12 |
| Use advising/ procedures | - | 6 | 5 | 3 |
| Controlling | - | 1 | 3 | 4 |
| Simulating | - | - | - | 2 |
| Configuration | - | - | 2 | 1 |
| Planning | 1 | 1 | 2 | - |
| Scheduling | - | - | - | 2 |

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## AI Corp. - KBMS

## Application Types:
## Detailed Analysis

| Type of Application | Number of Mentions | Examples |
|---|---|---|
| Data analysis/ interpretation | 5 | - Insurance underwriting<br>- Assistance to professionals<br>- Customer service data base |
| Planning | 1 | - Power load forecasting |

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## Aion - ADS

### Application Types:
### Detailed Analysis

| Type of Application | Number of Mentions | Examples |
|---|---|---|
| Data analysis/ interpretation | 15 | - Insurance underwriting<br>- Insurance claims<br>- Credit and loan approval<br>- Front-end for data capture<br>- Reports, medical svcs<br>- Product selec., financial svcs<br>- Risk evaluation, loans<br>- Filtering and sorting of data<br>- Payroll witholding<br>- Problem diagnosis<br>- Financial underwriting |
| Use advising/ procedures | 6 | - Help desk<br>- Training<br>- Assistance to programmers<br>- Legal checklist loans<br>- Human resources |
| Controlling | 1 | - DP room hardware monitoring |
| Planning | 1 | - Specifications aid |

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## Application Types:
## Detailed Analysis

| Type of Application | Number of Mentions | Examples |
|---|---|---|
| Data analysis/ interpretation | 9 | - Insurance underwriting<br>- Policyholder service<br>- Drug-product selection<br>- Credit scoring<br>- Purchase order classification<br>- Accounting assistance<br>- Point-scoring, reports<br>- Account balancing |
| Use advising/ procedures | 5 | - Help desk<br>- Travel expenses |
| Controlling | 3 | - Production control |
| Configuration | 2 | - Equipment config.<br>- Option config. |
| Planning | 2 | - Inventory analysis |

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## Neuron Data - NEXPERT

## Application Types:
## Detailed Analysis

| Type of Application | Number of Mentions | Examples |
|---|---|---|
| Data analysis/ interpretation | 12 | - Data-cataloging choices<br>- Photo interpretation<br>- Image-feature extraction<br>- Equipment fault diagnosis<br>- Front-end to data base<br>- Signal analysis<br>- Medical diagnosis/risks<br>- Report generation from data<br>- Classification<br>- Highlighting budget issues<br>- Production problems |
| Use advising/ procedures | 3 | - Guidance during interviewing<br>- Contracts: Clauses<br>- User interface, engineering |
| Controlling | 4 | - Control of VAX network<br>- Control of LAN network<br>- Intelligent user interface<br>- Manufacturing process |
| Simulating | 2 | - Estimating job costs<br>- Testability analysis |
| Configuration | 1 | - Order option configuration |
| Scheduling | 2 | - Constuction project seq.<br>- Avail. and use of auditors |

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# Which Types of Applications
# Are Being Built, by Whom

- **Mostly "diagnosing/classifying" applications**

  - Over 50%: Data analysis, interpretation
    (Examples: Insurance underwriting, bank lending)

  - About 20%:  Use advising, procedures
    (Example: Help desk)

  - Others: Controlling, planning, configuration,
    simulating

- **95% of sample:  No end-users build or modify
  expert system applications**

  - Almost always: "Knowledge engineers" were
    programmers

  - Mostly: Same person builds knowledge base,
    programs interfaces, and solves DP environment
    problems

- **Conclusion:  Despite relative simplicity of applica-
  tions, end-user development of expert systems is a
  "fiction"**

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## Marketplace Application Distinctions:
## Standalone vs. Embedded vs. Connected

| Vendor - Product | Number of Applications | | |
|---|---|---|---|
| | Standalone | Embedded | Connected |
| AI Corp. - KBMS | 0 | 4 | 2 |
| Aion - ADS | 11 | 3 | 9 |
| IBM - ESE | 10 | 7 | 4 |
| Neuron Data - NEXPERT | 7 | 7 | 1 |

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# Applications in Production
## vs. in Development

| Vendor -Product | No. in Production | No. in Development |
|---|:---:|:---:|
| AI Corp. - KBMS | 0 | 6 |
| Aion - ADS | 14 | 9 |
| IBM - ESE | 8 | 13 |
| Neuron Data - NEXPERT | 10 | 14 |

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# Overall Satisfaction with Purchase of Product: —Averages



Bar chart showing averages: AI Corp. KBMS = 4.2, Aion ADS = 4.6, IBM ESE = 3.0, Neuron Data NEXPERT = 4.1. Vertical axis labeled High (5), Neutral (3), Low (1).
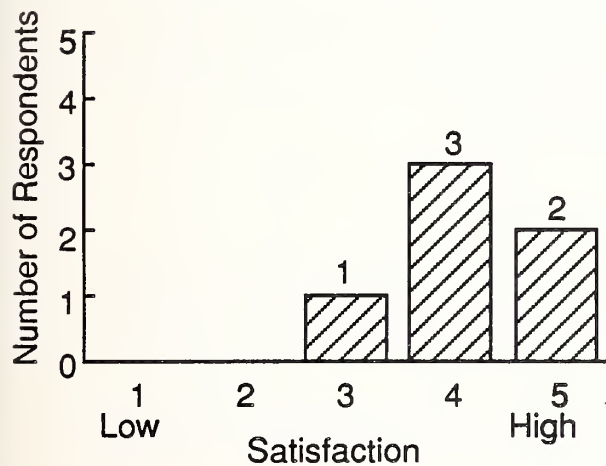
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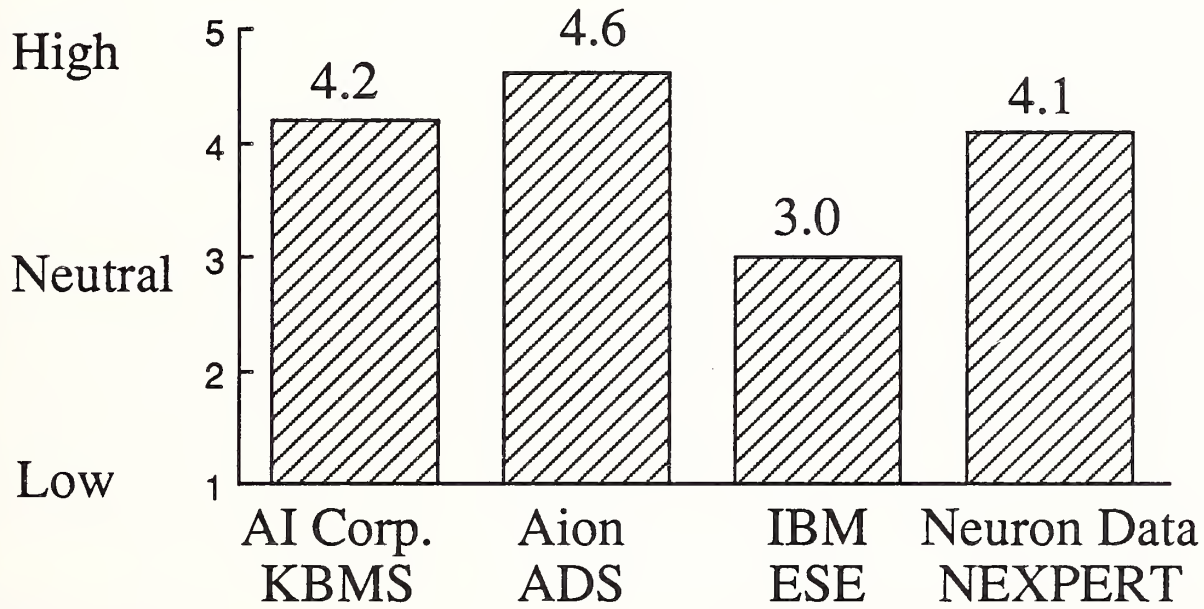
# Overall Satisfaction with Purchase of Product: Distribution of Responses

## AI Corp.—KBMS



Bar chart. Y-axis: Number of Respondents (0–5). X-axis: Satisfaction, 1 Low to 5 High.
- 3: 1
- 4: 3
- 5: 2

## Aion—ADS



Bar chart. Y-axis: Number of Respondents (0–8). X-axis: Satisfaction, 1 Low to 5 High.
- 4: 4
- 5: 6

## IBM—ESE



Bar chart. Y-axis: Number of Respondents (0–6). X-axis: Satisfaction, 1 Low to 5 High.
- 1: 1
- 2: 1
- 3: 5
- 4: 3

## Neuron Data—NEXPERT



Bar chart. Y-axis: Number of Respondents (0–8). X-axis: Satisfaction, 1 Low to 5 High.
- 3: 1
- 4: 6
- 5: 2
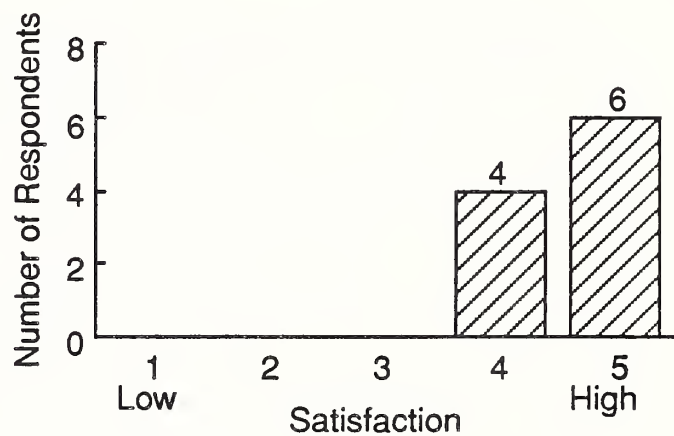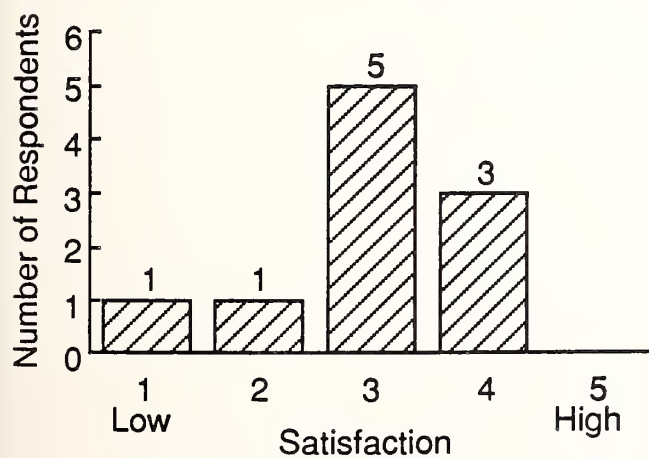
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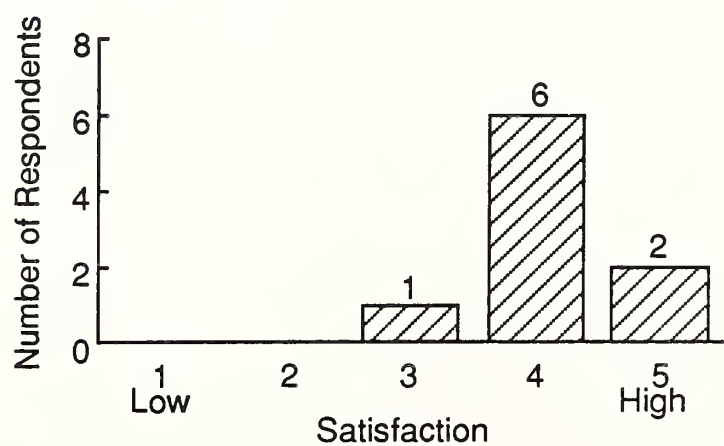
## AI Corp.—KBMS

## Overall Satisfaction with Purchase of Product:
## Repeat Comments

- Good overall functionality

- Easy to use (development)

- Effective natural language interface

- Useful object-oriented environment

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<u>Aion—ADS</u>

## Overall Satisfaction with Purchase of Product:
## Repeat Comments

- Strong range of development capabilities

- Easy to use (development)...*versus*...

- Negative:  Tough to use (development)

- Fits "production" IBM delivery environments

- Supports both PC and mainframe; applications portable

*sounds like a contradiction*

## Overall Satisfaction with Purchase of Product: Repeat Comments

- Strong, committed vendor and support

- Good for "simpler" applications, easy to use

- Negative:  Missing many functions

- Negative:  No PC support

- Negative:  Not compiled, therefore too slow

Neuron Data—NEXPERT

## Overall Satisfaction with Purchase of Product: Repeat Comments

- Wide range of development capabilities

- Useful object-oriented environment

- Portable (C-based)

- Good interfaces to applications and data bases

- Negative:  Some interface and portability problems

- Negative:  Some limits and disappointments throughout

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# Satisfaction: Range of Capabilities



|  | AI Corp. KBMS | Aion ADS | IBM ESE | Neuron Data NEXPERT |
|---|---|---|---|---|
| Rating | 4.3 | 4.2 | 3.1 | 4.3 |
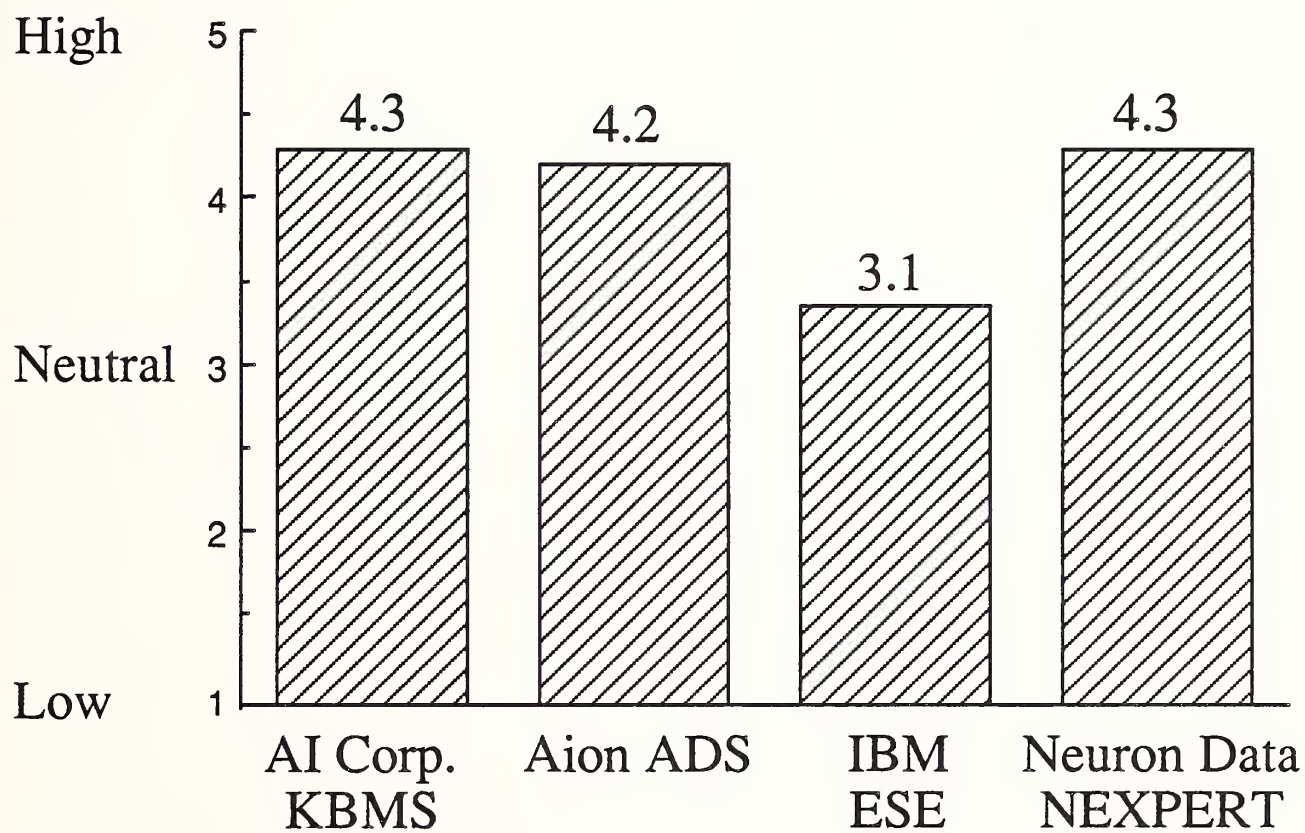
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# Satisfaction: Processor Resource Consumption
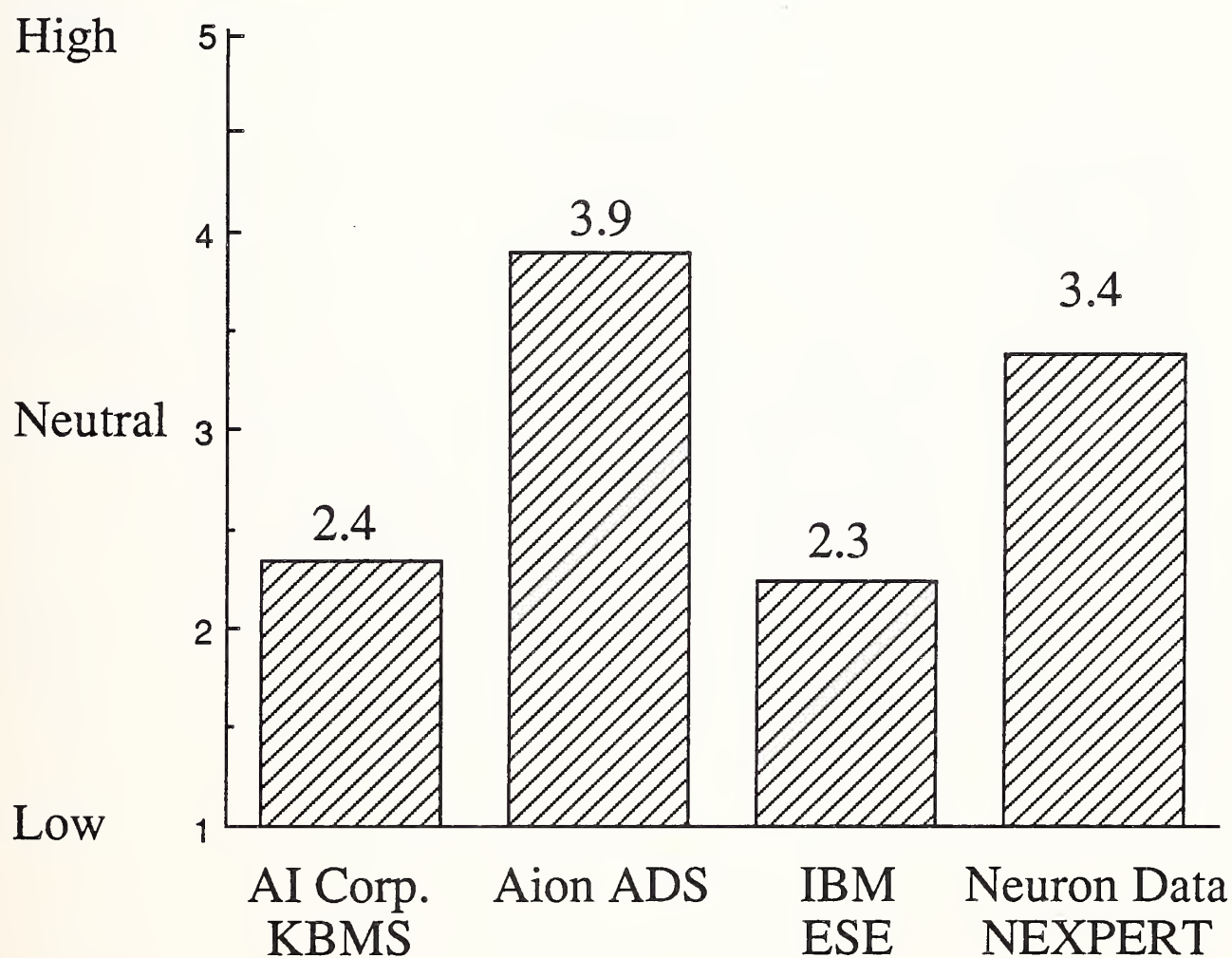
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# Satisfaction: Response Time
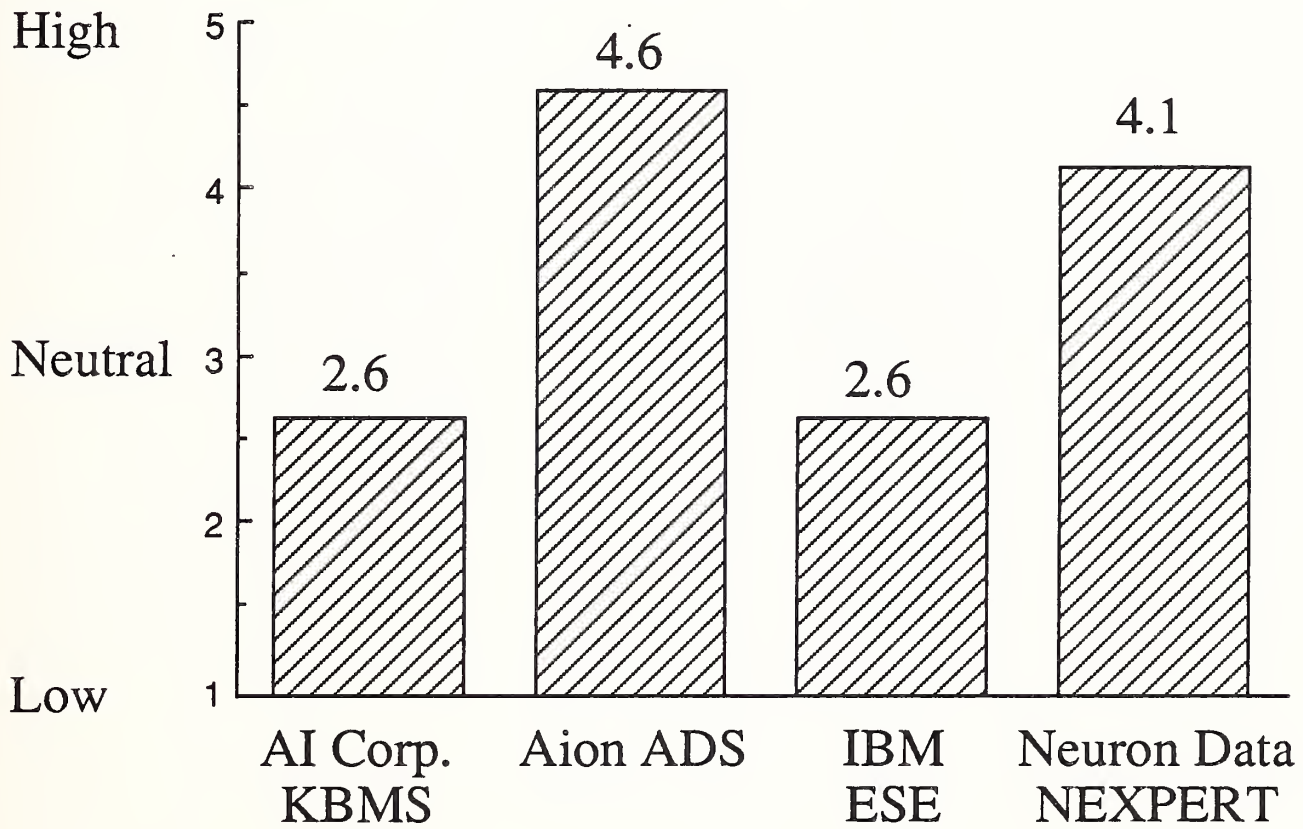
# Satisfaction:  Ease of Development
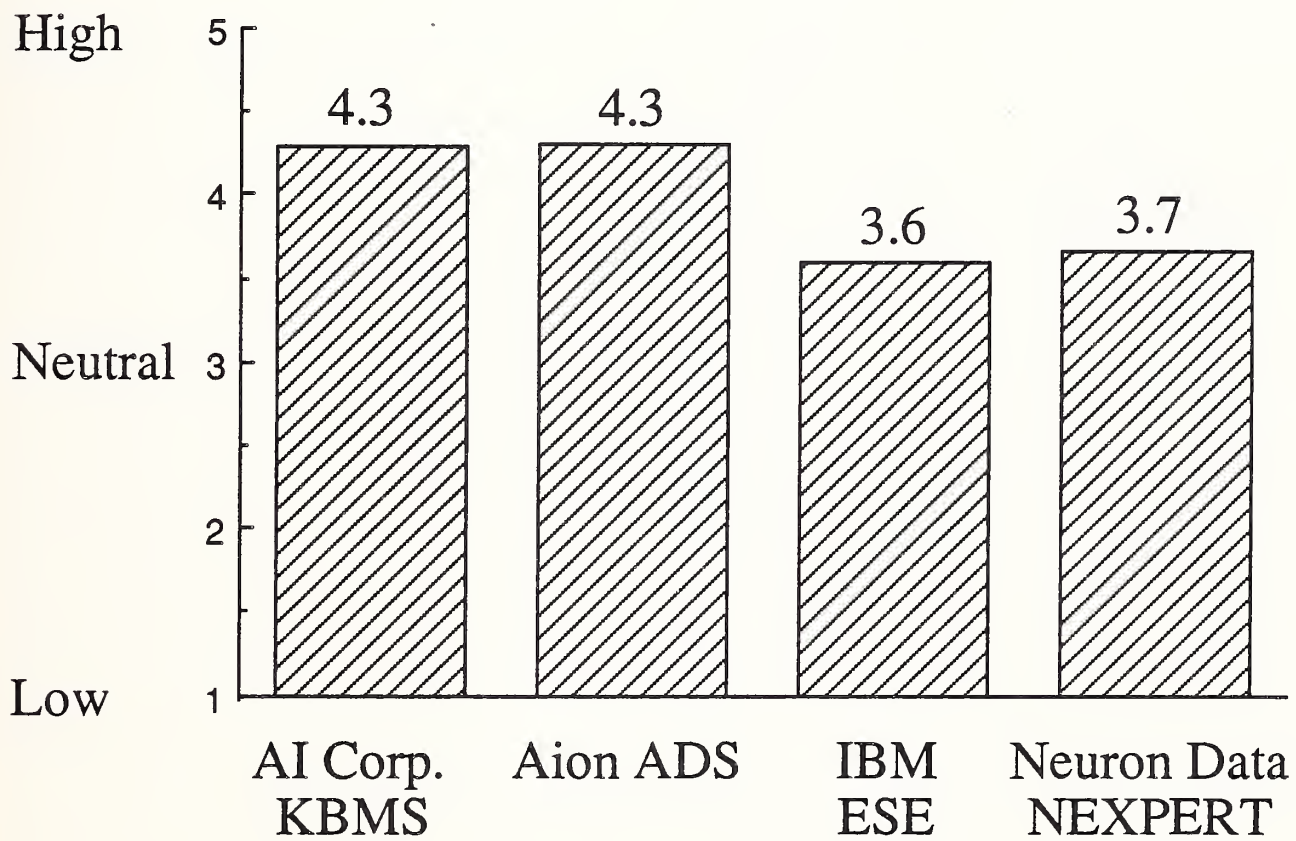
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# Satisfaction: Integration with Other Applications
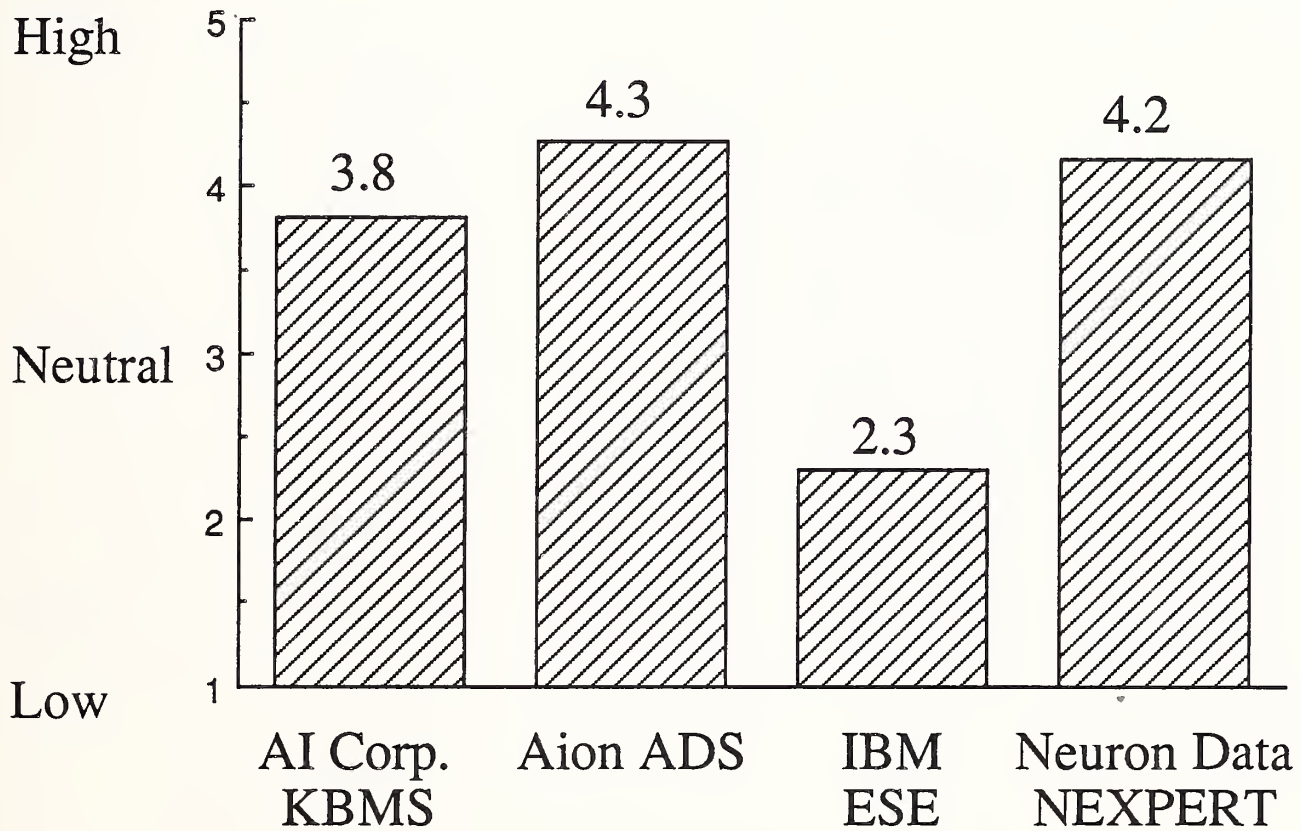
**Satisfaction: Documentation**
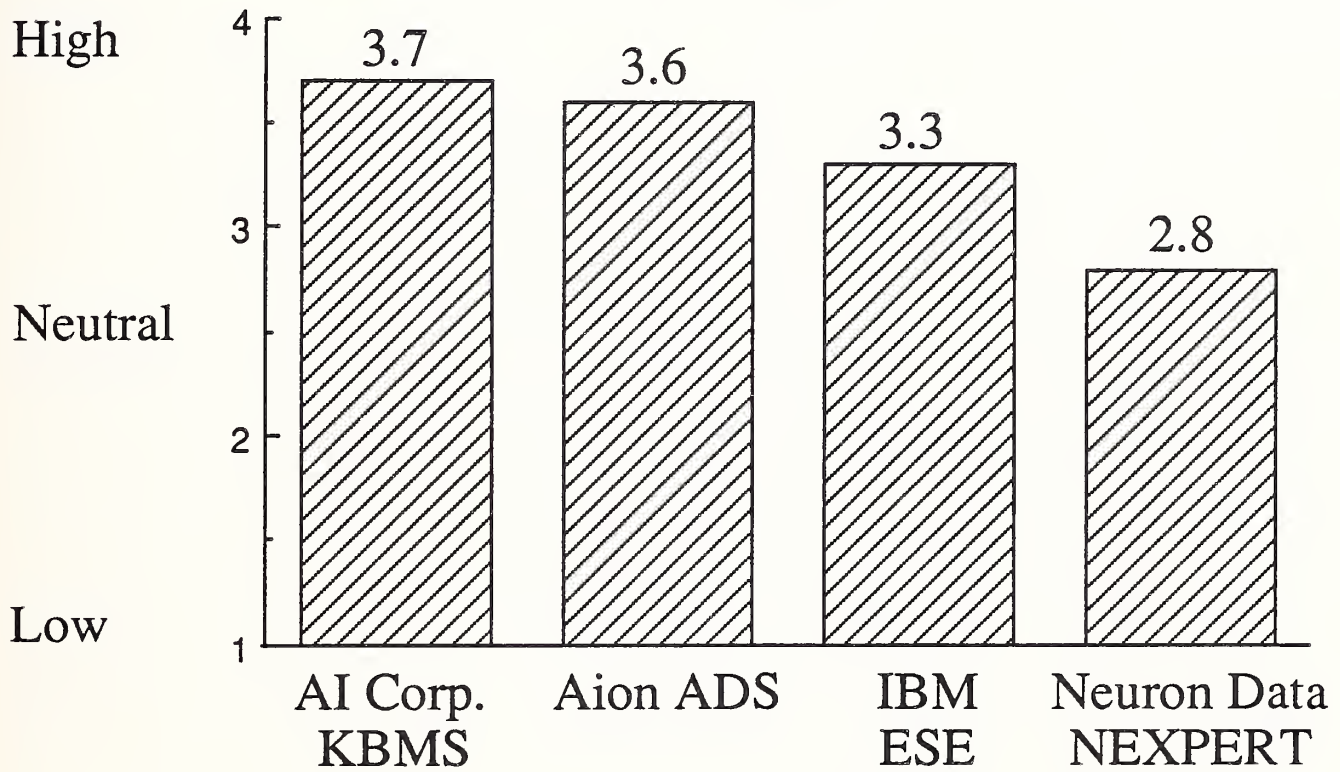
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# Satisfaction: Software Maintenance and Updates

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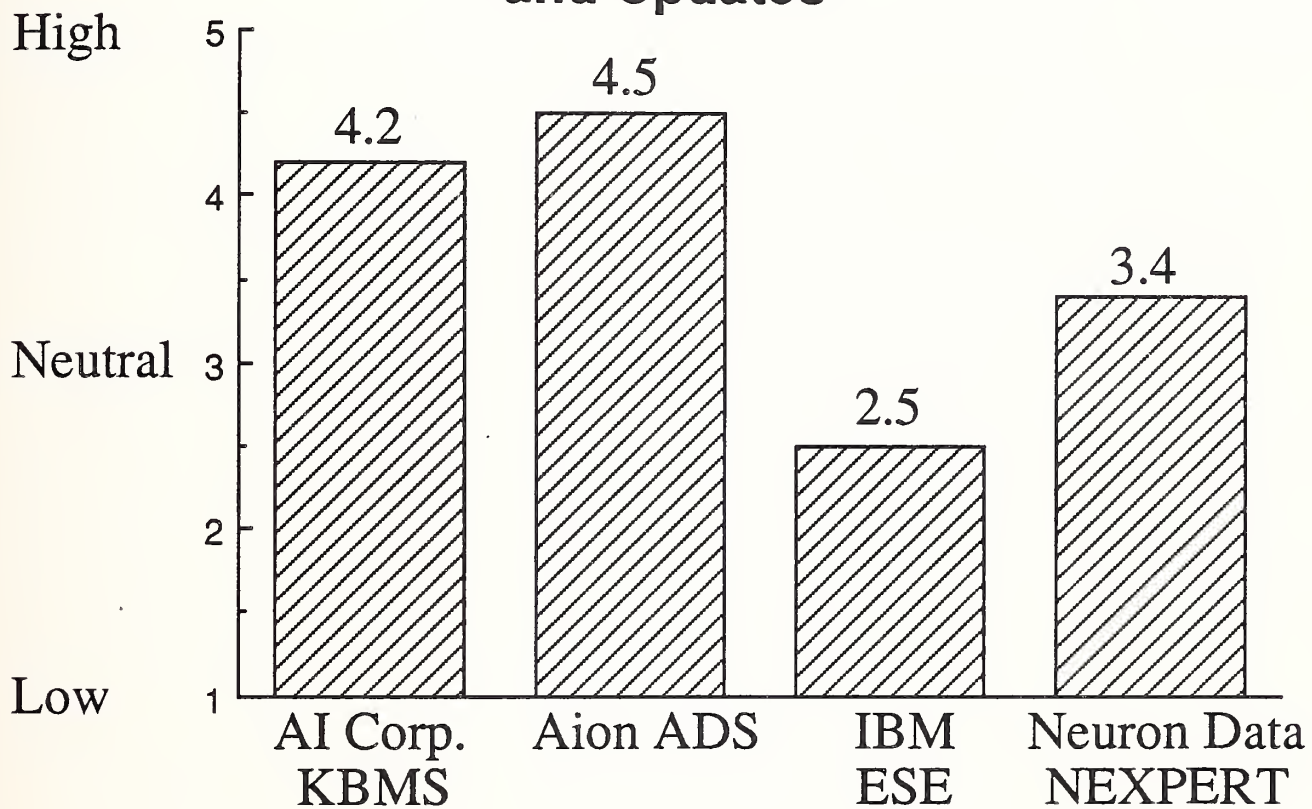
# Satisfaction: Customer Support and Hotline
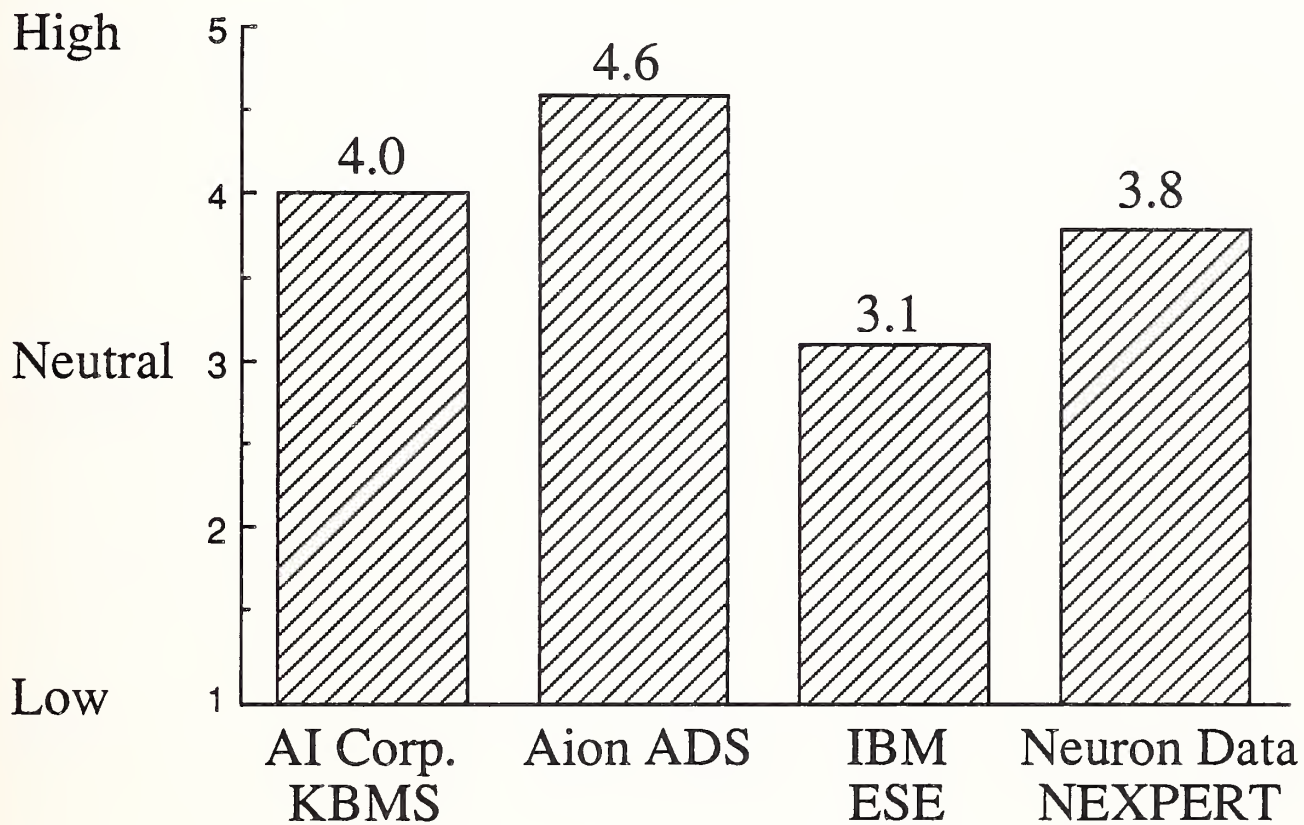


Note: Response distribution for IBM-ESE was not normal,
was bimodal around the values 2 and 4-5

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**Satisfaction: Comparing Price with Overall Value**

(Bar chart showing satisfaction ratings on a scale from Low (1) to Neutral (3) to High (5))

| Product | Rating |
|---|---|
| AI Corp. KBMS | 4.0 |
| Aion ADS | 4.1 |
| IBM ESE | 2.9 |
| Neuron Data NEXPERT | 4.4 |

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# Data-Distrubution Backup
# for Specific Satisfaction Charts

CLIENT data      File spread17
Question 7

| AI Corp. - KBMS | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | #R | Avg. | NotNorml |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7a-Range | 4 | 5 | 4 | 4 | 5 | 4 | | | | | 6 | 4.3 | |
| 7b-CPU | 2 | 2 | | 3 | 3 | 2 | | | | | 5 | 2.4 | |
| 7f-Mainframe | 2 | 2 | | 3 | 4 | 2 | | | | | 5 | 2.6 | |
| 7g-Ease | 4 | 4 | 4 | 5 | 5 | 4 | | | | | 6 | 4.3 | |
| 7h-Integration | 2 | 4 | 5 | 4 | 5 | 3 | | | | | 6 | 3.8 | |
| 7i-Documentation | 3 | 4 | 4 | 4 | 4 | 3 | | | | | 6 | 3.7 | |
| 7j-Maintenance | 4 | 4 | | 5 | 5 | 3 | | | | | 5 | 4.2 | |
| 7k-Customer | 4 | 3 | 3 | 5 | 5 | 4 | | | | | 6 | 4.0 | |
| 7l-Satisfaction | 3 | 4 | 4 | 4 | 5 | 4 | | | | | 6 | 4.0 | |

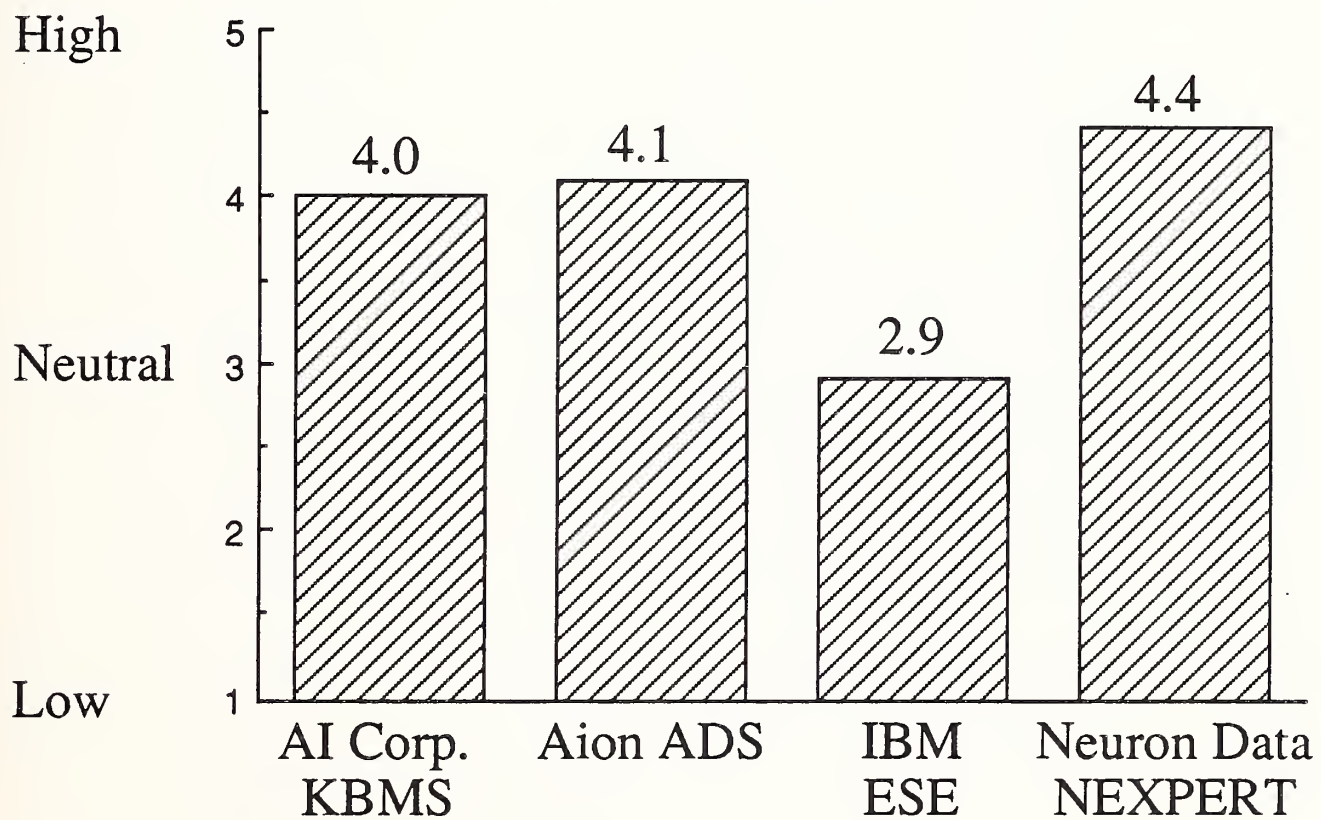| Aion - ADS | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | #R | Avg. | NotNorml |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7a-Range | 4 | 4 | 5 | 4 | 4 | 4 | 4 | 4 | 4 | 5 | 10 | 4.2 | |
| 7b-CPU | 4 | 3 | 5 | 4 | | 5 | 4 | 3 | 3 | 4 | 9 | 3.9 | |
| 7f-Mainframe | 4 | | 5 | 4 | | 5 | 4 | 5 | 5 | 5 | 8 | 4.6 | |
| 7g-Ease | 5 | 5 | 5 | 2 | 5 | 4 | 3 | 4 | 5 | 5 | 10 | 4.3 | |
| 7h-Integration | 5 | 4 | 5 | 5 | | 5 | 3 | 4 | 4 | 4 | 9 | 4.3 | |
| 7i-Documentation | 4 | 4 | 4 | 5 | 3 | 3 | 2 | 4 | 5 | 2 | 10 | 3.6 | |
| 7j-Maintenance | 5 | 5 | 5 | 5 | 3 | 5 | 4 | 4 | 5 | 4 | 10 | 4.5 | |
| 7k-Customer | 5 | 5 | 5 | 5 | 3 | 5 | 5 | 3 | 5 | 5 | 10 | 4.6 | |
| 7l-Satisfaction | 5 | 4 | 5 | 5 | 4 | 4 | 4 | 3 | 3 | 4 | 10 | 4.1 | . |

| IBM - ESE | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | #R | Avg. | NotNorml |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7a-Range | 3 | 4 | 4 | 2 | 3 | 4 | 4 | 2 | 1 | 4 | 10 | 3.1 | |
| 7b-CPU | | 1 | 2 | 2 | 3 | 1 | 4 | 2 | 3 | 3 | 9 | 2.3 | |
| 7f-Mainframe | 2 | 3 | 3 | 1 | 3 | 2 | 4 | 2 | 2 | 4 | 10 | 2.6 | |
| 7g-Ease | 3 | 5 | 4 | 2 | 5 | 4 | 4 | 4 | 1 | 4 | 10 | 3.6 | |
| 7h-Integration | 3 | 1 | 2 | 1 | 3 | 1 | 2 | 4 | 3 | 3 | 10 | 2.3 | |
| 7i-Documentation | 3 | 3 | 2 | 3 | 4 | 4 | 4 | 4 | 3 | 3 | 10 | 3.3 | |
| 7j-Maintenance | 2 | 3 | 3 | 3 | 2 | 1 | 3 | 1 | 3 | 4 | 10 | 2.5 | |
| 7k-Customer | 2 | 1 | 4 | 2 | 4 | 2 | 5 | 2 | 4 | 5 | 10 | 3.1 | not |
| 7l-Satisfaction | 2 | 3 | | 2 | 4 | 1 | 4 | 3 | 2 | 5 | 9 | 2.9 | |

| NeuronD - NEXPERT | 01 | 02 | 03 | 04 | 05 | 06 | 07 | 08 | 09 | 10 | #R | Avg. | NotNorml |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 7a-Range | 5 | 4 | 4 | 4 | 3 | 5 | 5 | 5 | 4 | 4 | 10 | 4.3 | |
| 7b-CPU | 3 | 3 | 5 | 3 | 2 | | 4 | | 3 | 4 | 8 | 3.4 | |
| 7f-Mainframe | 4 | 3 | 5 | 5 | 3 | | 5 | | 4 | 4 | 8 | 4.1 | |
| 7g-Ease | 3 | 2 | 5 | 4 | 3 | 4 | 4 | 5 | 4 | 3 | 10 | 3.7 | |
| 7h-Integration | 5 | | 4 | 5 | 4 | 3 | 4 | 5 | 3 | 5 | 9 | 4.2 | |
| 7i-Documentation | 3 | 3 | 4 | 2 | 2 | 3 | 3 | 4 | 2 | 2 | 10 | 2.8 | |
| 7j-Maintenance | 4 | 3 | 5 | 4 | 2 | 3 | 3 | 4 | 3 | 3 | 10 | 3.4 | |
| 7k-Customer | 2 | 5 | 5 | 5 | 5 | 4 | 2 | 3 | 4 | 3 | 10 | 3.8 | |
| 7l-Satisfaction | 5 | 4 | 5 | 4 | 4 | 4 | 5 | 5 | 4 | 4 | 10 | 4.4 | |

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# Top Mentions of Strengths and Weaknesses: Table

| Vendor - Product | Strengths | Weaknesses |
|---|---|---|
| **AI Corp. - KBMS** | - AI functions<br>- Object-oriented<br>- Mainframe-based<br>- Interfaces | - Performance<br>- Bugs |
| **Aion - ADS** | - AI functions<br>- Production functions<br>- Portability<br>- Interfaces<br>- Vendor | - (None significant) |
| **IBM - ESE** | - Ease of development<br>- Production functions<br>- Interfaces<br>- Vendor | - AI functions |
| **Neuron Data - NEXPERT** | - AI functions<br>- Object-oriented<br>- Graphics for dev't<br>- Portability<br>- Interfaces | - Bugs<br>- Crashes<br>- Vendor<br>- Documentation |

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*raises more questions than answers*

# Top Mentions of
# Strengths and Weaknesses:
# Cross Comparison

| Factor mentioned | Vendor - Product | | | |
| --- | --- | --- | --- | --- |
| | AI Corp. KBMS | Aion ADS | IBM ESE | Neuron Data NEXPERT |
| AI functions | + | + | - | + |
| Object-oriented | + | | | + |
| Graphics for dev't | | | | + |
| Ease of development | + | + | + | + |
| Production functions | | + | + | |
| Mainframe-based | + | | | |
| Portability | | + | | + |
| Interfaces | + | + | + | + |
| Performance | - | | | |
| Bugs | - | | | - |
| Crashes | | | | - |
| Vendor | | + | + | - |
| Documentation | | | | - |

Key: "+" = significant strength, "-" = significant weakness

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## Strengths and Weaknesses:
## Summary

- **Significant Strengths**

    - Object-oriented

    - Chaining, other AI functions

    - Database interfaces

    - Mainframe-based

- **Significant Weaknesses**

    - New-product bugs

    - Performance

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## Top Strengths

- **Object-oriented environment**
  (5 of 6)

  - Easy definition, development, and maintenance
  - Simple and rich representation of knowledge
  - One object replaces several rules

- **Solid AI functions, especially chaining**
  (4 of 6)

  - "A solid implementation"
  - Most of the needed functions are present
  - Good control of forward and backward chaining

- **Interfaces with databases**
  (4 of 6)

  - Applications depend on existing mainframe databases
  - Objects make defining interfaces easier

- **Operation on the IBM mainframe**
  (3 of 6)
  - Company-standard computing environment
  - Practical problem-solving in a production environment

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# Other Strengths

- **Integration with "natural language" capabilities**
  (2 of 6)

  - Easy to comprehend, for developer and user

- **Intelligent editor**
  (2 of 6)

  - Direct access speeds rule formulation and modification
  - Makes it easier for all to understand rules

- **Expert system is callable from other applications**
  (2 of 6)

  - Can function like an "expert sub-routine"

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## Top Weaknesses

- **New product, still has some bugs**
  (3 of 6)

  - Bugs disrupt development


- **Performance: Too much CPU resource, slow
  response time**
  (2 of 6)

  - Limits effective size of knowledge base

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## AI Corp. - KBMS

## Other Weaknesses

- **Needs better interfaces to databases**
  (1 of 6)

  - Substantial work to set up database interfaces

- **Limited hard-copy reporting capabilities**
  (1 of 6)

  - Report tables must be "hand massaged"

- **Hard to share development among knowledge engineers**
  (1 of 6)

  - Must manually integrate work of several developers

- **Text-based, not graphical**
  (1 of 6)

  - Would be easier to use with graphical development interface

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## Aion - ADS

# Strengths and Weaknesses
# Summary

- **Significant Strengths**

    - Superior AI functionality, overall

    - Good production functions

    - Mainframe/PC portability

    - Vendor strength

    - Database interfaces

- **Significant Weaknesses**

    - Some missing AI functionality

    - "None"

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## Aion - ADS

## Top Strengths

- **Superior overall AI- and production-oriented functionality**
  (9 of 10)

  - Easy for developers to learn and use
  - "Best product on the market"
  - Very wide range of capabilities
  - Development environment very consistent internally
  - Good structure for control of inferencing and chaining
  - Built for integration with IBM production environment
  - Excellent editing, tracing, and debugging
  - Good procedural capabilities, like looping and nesting

- **Portability between mainframe and PC**
  (6 of 10)

  - Develop on one, implement on that or other
  - Multiple mainframes can share one application
  - Large knowledge base on PC feasible
  - Flexible PC development, controlled mainframe production

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## More Top Strengths

- **Vendor strength, support, and credibility (5 of 10)**

    - Product still growing, in right ways
    - Founders involved and listen to needs
    - Year ago: Added access to multiple transaction environments
    - Coming in Rel. 5.0: Cooperative processing
    - Coming in Rel. 5.0: Object-oriented, frames, inheritance
    - Rapid response to problems, questions
    - Excellent overall support level
    - Vendor delivers as promised

- **Interfaces well with files and databases (2 of 10)**

    - VSAM, DL/1, DB2, dBASE3 all supported
    - No problems with formats of existing databases

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## Other Strengths

- **Can be embedded within existing applications**
  (1 of 10)

  - User sees a single, integrated application

- **Can share development among knowledge engineers**
  (1 of 10)

  - Easy to integrate modules
  - Splitting job speeds prototyping

- **Good text handling in tailored reports**
  (1 of 10)

  - Reports are critical for data analysis application

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## Top Weaknesses

- **Some useful AI functionality is missing**
  **(3 of 10)**

  - Tough to manage 150-plus rules; need more diagramming
  - Should offer inferring of rules from examples

- **"No significant weaknesses"**
  **(2 of 10)**

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## Aion - ADS

## Other Weaknesses

- **Database access could use some extensions**
  (2 of 10)
  - Needs better discrimination among data types
  - No direct link with IDMS-R files

- **Large knowledge bases cannot be run in PC memory**
  (2 of 10)
  - PC performance can be too slow
  - PC runs out of memory; Rel. 5.0 to correct for PS/2?

- **Performance can be slow**
  (1 of 10)
  - Compared to a compiled language
  - Limits ability to embed within high-volume applications

- **Documentation could use improvement**
  (1 of 10)
  - Tough to find some information
  - Need better indexing and examples

- **Editor for end-user screens cumbersome**
  (1 of 10)
  - Too much work to achieve some results

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## IBM - ESE

# Strengths and Weaknesses: Summary

- **Significant strengths**

  - Ease of development

  - Some good AI functions

  - Good production functions

  - Vendor strength

- **Significant weaknesses**

  - Missing AI functionality

  - Missing production functionality

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# Top Strengths

- **Easy to learn and develop with**
  (5 of 10)
  - Can get programmers up and running fast
  - No experience in expert systems required
  - Simple applications can be developed quickly
  - Vendor-provided sample applications very useful
  - System documents the application automatically
  - End-users can make changes to knowledge base

- **Some good AI- and production-oriented functions**
  (6 of 10)
  - Rule editors help enforce syntactic consistency, save time
  - Effective tracing of rule firing aids debugging
  - Rule nesting gives developers good visibility and access
  - Developer can immediately see end-user impact of KB changes
  - Good explanation features are built in
  - Rel. 1.1 provides good response time
  - Can test under VM and run production under MVS
  - Effective tool for configuration problems

- **Vendor strength and support**
  (3 of 10)
  - Vendor stable and committed to product
  - Documentation and hands-on support speeds learning
  - Both local and national support provided

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## IBM - ESE

## Other Strengths

- **Good graphics capabilities**
  (2 of 10)

  - Can interface with IBM GDDM for end-user graphics
  - Can tie definition of graphics to data elements

- **"No significant strengths"**
  (1 of 10)

*[handwritten: seems like a contradiction]*

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## IBM - ESE

## Top Weaknesses

- **Major pieces of AI functionality are missing (7 of 10)**
  - Functionality is not up to the level of the competition (KBMS)
  - Cannot handle sophisticated applications
  - Cannot merge two modules of a knowledge base
  - Rule editing is awkward with small on-screen window
  - Lack of inferencing control, thus get inappropriate rule jumps
  - Forward chaining needs pattern matching, and to be event-driven
  - Missing "else" function doubles number of rules
  - Lack of multiple current instantiation requires repeat handling
  - Object-oriented environment would reduce coding substantially
  - Maintenance would be much easier if object oriented
  - Needs object-based inheritance
  - Cannot watch trace facility during consultation
  - No hard-copy reports of reasoning behind recommendations

- **Missing some production-oriented functionality (6 of 10)**
  - Lots of abends result if environment not set up right
  - With memory limitations, an abend means major loss of data
  - Need a compiled version for faster performance
  - CICS production environment is not fully supported
  - Need interface for existing IMS applications
  - For CPU planning, need ability to project production resources

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## Other Weaknesses

- **DB2 is the only database interface**
  (2 of 10)

  - Other databases are important also

- **"No significant weaknesses"**
  (2 of 10)

  *apparent drop - contradiction*

- **Lack of portability between mainframe and PC**
  (1 of 10)

  - Desirable for both development and production

- **Not easy enough to develop with**
  (1 of 10)

  - Versus PC-based products with comparable functionality

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## Neuron Data - NEXPERT

## Strengths and Weaknesses:
## Summary

- **Significant strengths**

    - Strong hybrid of objects and rules

    - Graphics-based development

    - Macintosh/VAX/PC portability

    - Database and application interfaces

- **Significant weaknesses**

    - Some AI functions

    - Documentation

    - Vendor support

    - Bugs and crashes

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# Neuron Data - NEXPERT

## Top Strengths

- **Strong "hybrid" environment of objects and rules**
  (8 of 10)
  - "A powerful combination"
  - "More than the sum of the parts"
  - Provides great flexibility and productivity for developers
  - Makes application maintenance easier
  - Inheritance handled well
  - Permits good control of inferencing sequences
  - Ideal for process control, production, configuration applications
  - Supports implementation of LISP routines

- **Graphics-based development**
  (7 of 10)
  - Greatly speeds application development
  - Provides clarity in managing structure of rules and objects
  - Very effective windowing
  - "An intuitive approach to development"

- **Portable among Macintosh, VAX, and PC**
  (7 of 10)
  - Excellent C-based approach to portability
  - Can support other environments in future
  - Can develop in one environment (Mac) and deliver in other (PC)
  - Fits with installed production machines

- **Good interfaces with databases and other applications**
  (5 of 10)
  - C-based strategy works well for interfaces
  - Applications interfaces operate either way
  - Vendor-provided run-time libraries in C save time
  - "Connects well with our pre-existing DBs and applications"

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# Other Strengths

- **Can be embedded within existing applications**
  (2 of 10)

  - Easy because C-based


- **Fast in execution**
  (2 of 10)

  - Because C-based (?)

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# Neuron Data - NEXPERT
## Top Weaknesses

- **Some problems with AI and production functionality**
  (7 of 10)
  - To edit must move between development and production environments
  - Naming of objects not flexible enough
  - Lacks object message passing
  - Impacts of "demons" not clear
  - Hard to control forward chaining
  - Needs a full semantic net (not just partial)
  - Needs the flexibility of LISP
  - Portability and interfacing not as good as claimed
  - Need new C-routines in library for error analysis
  - With Macintosh, database interfaces are limited

- **Documentation needs improvement**
  (5 of 10)
  - Some errors
  - Full use of some commands not covered
  - Not presented clearly, tough to use
  - OK as reference, but not enough "how to"
  - Not well organized or indexed
  - Special problems: Sun workstation platform

- **Problems in vendor support**
  (2 of 10)
  - Distribution/support split: Vendor, Bechtel, DEC
  - Sometimes tough to get answers
  - Vendor seems worried about stealing of secrets

- **Some bugs and crashes**
  (3 of 10)
  - Better now
  - Compared to LISP, product still immature
  - Some very ungraceful crashes encountered
  - Hard to find some crash sources

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## Other Weaknesses

- **Limited end-user graphics capabilities**
  (2 of 10)

  - Must supplement with expensive outside products
  - Not machine-independent/portable

- **"No significant weaknesses"**
  (1 of 10)

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# Highest-Priority Missing Features: Table

| Vendor - Product | Missing Features or Functions |
|---|---|
| • **AI Corp. - KBMS** | - Modular, shared development<br>- PC development/production |
| • **Aion - ADS** | - Object-oriented development (strengthen)<br>- Frames<br>- Expanded memory<br>- Cooperative processing<br>- Flexible options to format end-user screens |
| • **IBM - ESE** | - Object-oriented development<br>- Conditional inferencing, Focus Control Blocks<br>- PC development/production<br>- CICS version<br>- Improved/new interfaces |
| • **Neuron Data - NEXPERT** | - Full semantic net (not partial)<br>- Better tools for end-user graphics<br>- Improved/new interfaces<br>- Better documentation |

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# Highest-Priority Missing Features: Cross Comparison

| Missing Feature or Function | AI Corp. KBMS | Aion ADS | IBM ESE | Neuron Data NEXPERT |
|---|---|---|---|---|
| Object-oriented dev't | | X | X | |
| Frames | | X | | |
| Cond'l inferencing, FCBs | | | X | |
| Full semantic net | | | | X |
| Tools, end-user graphics | | | | X |
| Modular, shared dev't | X | | | |
| PC development/prod'n | X | | X | |
| Expanded memory | | X | | |
| Cooperative processing | | X | | |
| CICS version | | | X | |
| Improved/new interfaces | | | X | X |
| Better documentation | | | | X |

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## "Feature Wish List":
## Priority Analysis

| Feature or Function | Number of Times Stated as: | |
| --- | --- | --- |
| | "Must Have" | "Nice to Have" |
| **PC development/ production** | 3 | 1 |
| **Modular, shared development** | 3 | 1 |

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## AI Corp. - KBMS

### "Feature Wish List":
### Priority Analysis

| Feature or Function | Number of Times Stated as: | |
|---|---|---|
| | "Must Have" | "Nice to Have" |
| Copy and reuse blocks of rules | 1 | |
| Split screen/windowing for development | 1 | |
| Faster operation | 1 | |
| | | |
| Better object inheritance | | 1 |
| Place comment statements in code | | 1 |
| Rule/pattern induction from examples | | 1 |

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## Aion - ADS

## "Feature Wish List":
## Priority Analysis

| Feature or Function | Number of Times Stated as: | |
|---|---|---|
| | "Must Have" | "Nice to Have" |
| Cooperative processing | 1 | 1 |
| Object-oriented development (strengthen) | 1 | 1 |
| Frames | (1) | 1 |
| Expanded memory | | 2 |
| Flexible options to format end-user screens | | 2 |

*Extended Memory or 640+ on the PC ?*

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## Aion - ADS

## "Feature Wish List":
## Priority Analysis

| Feature or Function | Number of Times Stated as: | |
|---|---|---|
| | "Must Have" | "Nice to Have" |
| Inheritance | 1 | |
| Infer rules from examples | 1 | |
| Better date manipulation, other formats | 1 | |
| Improved string searching | 1 | |
| Better editing of data from databases | 1 | |
| Direct user access if embedded in IMS, CICS | 1 | |
| Better back up for crashes | 1 | |
| End-user graphical objects (like meters) | | 1 |
| Faster operation in production | | 1 |
| Diagramming of knowledge bases | | 1 |
| Non-monotonic reasoning (common sense) | | 1 |
| Better tracing and explanation | | 1 |
| Direct access to IDMS-R files | | 1 |
| Stronger report generation, incl. columns | | 1 |
| (None) | | 1 |

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## "Feature Wish List":
## Priority Analysis

| Feature or Function | Number of Times Stated as: | |
|---|---|---|
| | "Must Have" | "Nice to Have" |
| **Interfaces:** | | |
| - Better interfaces to applications | 1 | |
| - Call expert system from another appli. | 1 | |
| - Interface with IMS applications | 1 | |
| - DB interfaces: IDMS, dBASEIII, CICS, VSAM | 1 | |
| - Better interfacing instructions | 1 | |
| **Object-oriented development** | 2 | 1 |
| **PC development/ production** | 2 | |
| **CICS version** | 2 | |
| **Conditional infer., Focus Control Blocks** | 1 | 1 |

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## "Feature Wish List":
## Priority Analysis

| Feature or Function | Number of Times Stated as: | |
|---|---|---|
| | "Must Have" | "Nice to Have" |
| Multiple current instantiations | 1 | |
| View trace during consultation session | 1 | |
| "Else" capability | 1 | |
| Better number/string conversion | 1 | |
| Bring AI functions up to competition | 1 | |
| Given capabilities, make easier to develop | 1 | |
| (Scrapping product in favor of KEE) | 1 | |
| | | |
| More explicit manual, good examples | | 1 |
| Control of end-user screens by rules | | 1 |
| Non-GDDM end-user graphics | | 1 |
| Hard-copy report generation | | 1 |
| Decreased impact on mainframe processor | | 1 |
| Cooperative processing | | 1 |
| Graphics-based development | | 1 |
| (None) | | 1 |

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## Neuron Data - NEXPERT

## "Feature Wish List":
## Priority Analysis

| Feature or Function | Number of Times Stated as: | |
| --- | --- | --- |
| | "Must Have" | "Nice to Have" |
| **Better tools for end-user graphics** | 3 | 2 |
| **Better documentation: more examples, depth** | 2 | 1 |
| **Interfaces:** | | |
| - Stronger DB interfaces | 1 | |
| - Better interface with applications | 1 | |
| **Full semantic net (not partial)** | 1 | 1 |

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## Neuron Data - NEXPERT

## "Feature Wish List":
## Priority Analysis

| Feature or Function | Number of Times Stated as: | |
| --- | --- | --- |
| | "Must Have" | "Nice to Have" |
| Window-based floating-point operations | 1 | |
| Better message passing between objects | 1 | |
| | | |
| Additions to C-routine libraries | | 1 |
| Multiple attributes for a property | | 1 |
| Better control of forward chaining | | 1 |
| Better Mac to PC transfer of text | | 1 |
| Debugging access to rule firing sequence | | 1 |
| Easier PC-to-PC transfer, different configurations | | 1 |
| Remove copy protection (AT version) | | 1 |
| (None) | | 1 |

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# Is the Product at the "State of the Art"?
## Which Others Are?

| Vendor - Product | Number of Mentions | | | Others Cited |
|---|---|---|---|---|
| | Yes | No | Not Sure | |
| AI Corp. - KBMS | 6 | 0 | 0 | Aion - ADS<br>Inference Corp. - ART<br>Neuron Data - NEXPERT<br>Intellicorp - KEE |
| Aion - ADS | 7 | 1 | 2 | No others at "state" (3)<br>Neuron Data - NEXPERT<br>Intellicorp - KEE<br>AI Corp. - KBMS<br>Texas Instru. - PC Cons.<br>Knowledge Bldrs - Level 5<br>IBM - Knowledge Tool |
| IBM - ESE | 1 | 8 | 1 | Aion - ADS (4)<br>AI Corp - KBMS (3)<br>Intellicorp - KEE (3)<br>Inference Corp. - ART (3)<br>Carnegie - Knowl. Craft<br>Knowl. Garden-Knowl. Pro<br>Neuron Data-NEXPERT |
| Neuron Data - NEXPERT | 9 | 1 | 0 | Intellicorp - KEE (6)<br>Gold Hill - GoldWorks (5)<br>Inference Corp. - ART (3)<br>Carnegie - Knowl. Craft<br>LISP<br>No others at "state" |

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## AI Corp. - KBMS

## Today's Product: Vendor Interviews

- Hardware
  - Mainframe

- Mainframe operating systems
  - VM, MVS/XA

- Mainframe transaction processing
  - CICS, TSO, IMS/DC, IDMS/DC, CMS

- Standard file and database interfaces
  - DB2, DL/1, VSAM, IDMS-R, ADABASE

- Application interfaces
  - 2-way, through embedded SQL statements; Cobol or PL/I

- SQL support
  - Yes

- Top industries and applications
  - Insurance: Underwriting, claims
  - Retail trade: Pricing of orders

- Pricing
  - $90,000 base, options can take total to $160,000

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## Aion - ADS

## Today's Product:  Vendor Interviews

- Hardware
  - Mainframe or PC

- Mainframe operating systems
  - Any one

- Mainframe transaction processing
  - IMS, CICS

- Standard file and database interfaces
  - VSAM, QSAM, SQL/DS, DB2, DL/1

- Application interfaces
  - 2-way, in-memory transfer of data, applications in C, Pascal, Cobol, PL/I

- SQL support
  - Yes

- Top industries and applications
  - Insurance:  Underwriting, claims
  - Oil and gas:  Chemical blending, treatment, help desk
  - Telecommunications:  Network design

- Pricing
  - $60-70,000 base (MVS vs. VM), options can take total to $155,000
  - Will cut deals

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## IBM - ESE

### Today's Product: Vendor Interviews

- Hardware
  - Mainframe

- Mainframe operating systems
  - VM, MVS

- Mainframe transaction processing
  - TSO, CMS, IMS, CICS

- Standard file and database interfaces
  - VSAM, SQL-based interfaces

- Application interfaces
  - Call out from ESE to application

- SQL support
  - Yes

- Top industries and applications
  - Insurance: Underwriting, claims
  - Manufacturing: Diagnosis, configuration
  - Finance: Loan authorization

- Pricing 42,500
  - $35,000 base, development system; $7,500 ~~including~~ consultation ~~only~~

## Neuron Data - NEXPERT

## Today's Product: Vendor Interviews

- Hardware
  - Mac, PC, VAX, Unix workstation,

- Mainframe operating systems
  - VM (January 1989)

- Mainframe transaction processing
  - (Not yet)

- Standard file and database interfaces
  - Through SQL: Lotus, Excel, dBASEIII, Oracle, Sybase, Ingres, Informix

- Application interfaces
  - 2-way function calls

- SQL support
  - Yes

- Top industries and applications
  - Aerospace: Diagnosis, quality control of manufacturing
  - Financial services: Trading, recommend products, insurance evaluation
  - Manufacturing: Configuration of parts, manufacturing control

- Pricing
  - $5,000 base, Mac or PC
  - $8,000 base, VAX or Unix workstation
  - $2,000 to $25,000 base, depending on workstation mainframe size

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## AI Corp. - KBMS

## Next Release:  Vendor Interviews

- Date
    - April 1989

- New capabilities
    - 90% decrease in mainframe utilization
    - Support for multiple shared development
    - OS/2 version
    - Standalone or cooperative processing
    - MS-DOS execution version

## Aion - ADS

## Next Release:  Vendor Interviews

- Date
  - Summer 1989

- New capabilities
  - Full object-oriented development

## IBM - ESE

### Next Release: Vendor Interviews

- Date
  - March 1989

- New capabilities
  - DOS-based PC consultation environment

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## Neuron Data - NEXPERT

## Next Release: Vendor Interviews

- Date
  - Summer 1989

- New capabilities
  - MVS-based mainframe run-time environment
    - CICS, TSO, DB2, SQL/DS, VSAM, IMS
  - DB2 and DL/1 access through SQL/DS
  - Full semantic net
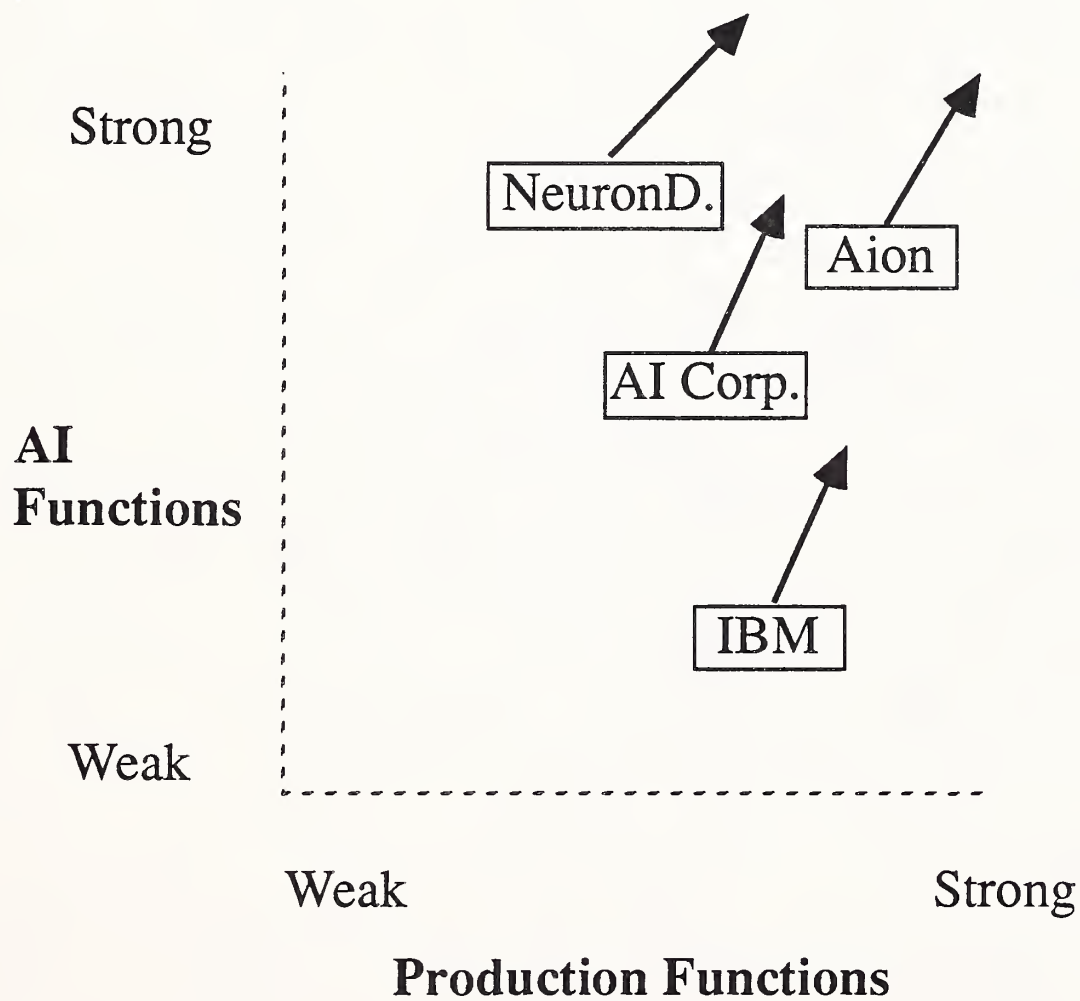  - Graphics tool kit for end-user screen painting

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# Future (1990-on) Product Directions:
## Vendor Interviews

- **AI Corp - KBMS**
  - Operation on more hardware platforms: DEC VAX, Unix workstations


- **Aion - ADS**
  - Support for AS/400?
  - Implementation of IBM's SAA


- **IBM - ESE**
  - More AI capabilities
  - Wider database access
  - Operation on more hardware platforms: AS/400
  - "Non-monotonic" reasoning

- **Neuron Data - NEXPERT**

  - "Knowledge acquisition module": System will extract KB from expert through dialog

  - Learning systems: Rules will be developed by system from monitoring of production experience

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# Relative Product Positions and Expected Movement: INPUT's View



Strong

AI
Functions

Weak

NeuronD.

Aion

AI Corp.

IBM

Weak                    Strong

**Production Functions**

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